What is claimed is:

1. A self-healing liquid contact switch, comprising:

an upper actuating surface including a first plurality of liquid contact regions;

a lower actuating surface including a second plurality of liquid contact regions spaced apart from said first plurality of liquid contact regions; and

a liquid metal disposed within the space between the upper and lower actuating surfaces, said liquid metal being configured to wet with said first and second plurality of liquid contact regions to electrically actuate the switch.

2. The self-healing liquid contact switch of claim 1, wherein each of said first and second plurality of liquid contact regions are arranged in increasing size from an outer periphery of said upper and lower actuating surfaces to an inner portion thereof.

3. The self-healing liquid contact switch of claim 2, wherein said first and second plurality of liquid contact regions increase in size from 2 microns at said outer periphery to 3 microns at said inner portion.

4. The self-healing liquid contact switch of claim 1, wherein each of said first and second plurality of liquid contact regions includes a wetable layer of platinum.

5. The self-healing liquid contact switch of claim 1, wherein said liquid metal includes liquid gallium.

6. The self-healing liquid contact switch of claim 1, wherein said first and second plurality of liquid contact regions each include a pattern of liquid contact regions.

7. The self-healing liquid contact switch of claim 6, wherein said pattern of liquid contact regions comprises a patterned array of linearly converging lines.

8. The self-healing liquid contact switch of claim 6, wherein said pattern of liquid contact regions comprises a spiraled pattern of liquid contact regions.

9. The self-healing liquid contact switch of claim 1, further comprising one or more wetable traces interconnecting said first and second plurality of liquid contact regions.

10. The self-healing liquid contact switch of claim 9, wherein said one or more wetable traces are tapered.

11. The self-healing liquid contact switch of claim 1, further comprising an upper and lower actuating electrode each including one or more metal layers coupled to a base layer.

12. The self-healing liquid contact switch of claim 11, further comprising a pattern of getter dots disposed on at least one of said first and second actuating electrodes.

13. The self-healing liquid contact switch of claim 11, further comprising a number of spacer elements disposed on at least one of said first and second actuating electrodes.

14. The self-healing liquid contact switch of claim 11, wherein at least one of said upper and lower actuating electrodes includes a custom sloped surface.

15. The self-healing liquid contact switch of claim 14, wherein said custom sloped surface includes an S-shaped sloped surface.

16. The self-healing liquid contact switch of claim 14, wherein said custom sloped surface is recessed with the upper and/or lower actuating electrodes at a depth of about 4 to 8 microns.

17. The self-healing liquid contact switch of claim 1, further including a hermetically sealed enclosure containing argon gas.

18. The self-healing liquid contact switch of claim 1, further comprising heating means for heating said upper and lower actuating surfaces.

19. The self-healing liquid contact switch of claim 18, wherein said heating means includes one or more heater elements arranged about the upper and/or lower actuating surfaces.

20. The self-healing liquid contact switch of claim 1, wherein each of said upper and lower actuating surfaces includes a leading surface and a trailing surface.

21. The self-healing liquid contact switch of claim 20, wherein said leading surface includes a non-wetable layer of tungsten.

22. A self-healing liquid contact switch, comprising:

an upper actuating surface operatively coupled to an upper actuating electrode, said upper actuating surface including a first plurality of liquid contact regions;

a lower actuating surface operatively coupled to a lower actuating electrode, said lower actuating surface including a second plurality of liquid contact regions spaced apart from said first plurality of liquid contact regions; and

a liquid metal disposed within the space between the upper and lower actuating surfaces, said liquid metal being configured to wet with said first and second plurality of liquid contact regions to electrically actuate the switch.

23. The self-healing liquid contact switch of claim 22, wherein each of said first and second plurality of liquid contact regions are arranged in increasing size from an outer periphery of said upper and lower actuating surfaces to an inner portion thereof.

24. The self-healing liquid contact switch of claim 23, wherein said first and second plurality of liquid contact regions increase in size from 2 microns at said outer periphery to 3 microns at said inner portion.

25. The self-healing liquid contact switch of claim 22, wherein each of said first and second plurality of liquid contact regions includes a wetable layer of platinum.

26. The self-healing liquid contact switch of claim 22, wherein said liquid metal includes liquid gallium.

27. The self-healing liquid contact switch of claim 22, wherein said first and second plurality of liquid contact regions each include a pattern of liquid contact regions.

28. The self-healing liquid contact switch of claim 27, wherein said pattern of liquid contact regions comprises a patterned array of linearly converging lines.

29. The self-healing liquid contact switch of claim 27, wherein said pattern of liquid contact regions comprises a spiraled pattern of liquid contact regions.

30. The self-healing liquid contact switch of claim 22, further comprising one or more wetable traces interconnecting said first and second plurality of liquid contact regions.

31. The self-healing liquid contact switch of claim 30, wherein said one or more wetable traces are tapered.

32. The self-healing liquid contact switch of claim 22, further comprising a pattern of getter dots disposed on at least one of said first and second actuating electrodes.

33. The self-healing liquid contact switch of claim 22, further comprising a number of spacer elements disposed on at least one of said first and second actuating electrodes.

34. The self-healing liquid contact switch of claim 22, wherein at least one of said upper and lower actuating electrodes includes a custom sloped surface.

35. The self-healing liquid contact switch of claim 34, wherein said custom sloped surface includes an S-shaped sloped surface.

36. The self-healing liquid contact switch of claim 34, wherein said custom sloped surface is recessed with the upper and/or lower actuating electrodes at a depth of about 4 to 8 microns.

37. The self-healing liquid contact switch of claim 22, further including a hermetically sealed enclosure containing argon gas.

38. The self-healing liquid contact switch of claim 22, further comprising heating means for heating said upper and lower actuating surfaces.

39. The self-healing liquid contact switch of claim 38, wherein said heating means includes one or more heater elements arranged about the upper and/or lower actuating surfaces.

40. The self-healing liquid contact switch of claim 22, wherein each of said upper and lower actuating surfaces includes a leading surface and a trailing surface.

41. The self-healing liquid contact switch of claim 40, wherein said leading surface includes a non-wetable layer of tungsten.

42. A self-healing liquid contact switch, comprising:

an upper actuating surface operatively coupled to an upper actuating electrode, said upper actuating surface including a first plurality of liquid contact regions;

a lower actuating surface operatively coupled to a lower actuating electrode, said lower actuating surface including a second plurality of liquid contact regions spaced apart from said first plurality of liquid contact regions;

a liquid metal disposed within the space between the upper and lower actuating surfaces, said liquid metal being configured to wet with said first and second plurality of liquid contact regions to electrically actuate the switch; and

one or more heater elements configured to heat the liquid metal.

43. A self-healing liquid contact switch, comprising:

an upper actuating surface operatively coupled to an upper actuating electrode, said upper actuating surface including a first plurality of liquid contact regions increasing size from an outer periphery of said upper surface to an inner portion thereof;

a lower actuating surface operatively coupled to a lower actuating electrode, said lower actuating surface including a second plurality of liquid contact regions spaced apart from said first plurality of liquid contact regions, each of said second plurality of liquid contact regions increasing in size from an outer periphery of said lower actuating surface to an inner portion thereof; and

a liquid metal disposed within the space between the upper and lower actuating surfaces, said liquid metal being configured to wet with said first and second plurality of liquid contact regions to electrically actuate the switch.

44. A self-healing liquid contact MEMS RF switch, comprising:

an upper diaphragm including a first plurality of liquid contact regions;

a lower diaphragm including a second plurality of liquid contact regions spaced apart from said first plurality of liquid contact regions; and

a liquid metal disposed within the space between the upper and lower diaphragms, said liquid metal being configured to wet with said first and second plurality of liquid contact regions to electrically actuate the switch.

45. The self-healing liquid contact MEMS RF switch of claim 44, wherein each of said first and second plurality of liquid contact regions are arranged in increasing size from an outer periphery of said upper and lower diaphragm to an inner portion thereof.

46. The self-healing liquid contact MEMS RF switch of claim 45, wherein said first and second plurality of liquid contact regions increase in size from 2 microns at said outer periphery to 3 microns at said inner portion.

47. The self-healing liquid contact MEMS RF switch of claim 44, wherein each of said first and second plurality of liquid contact regions includes a wetable layer of platinum.

48. The self-healing liquid contact MEMS RF switch of claim 44, wherein said liquid metal includes liquid gallium.

49. The self-healing liquid contact MEMS RF switch of claim 44, wherein said first and second plurality of liquid contact regions each include a pattern of liquid contact regions.

50. The self-healing liquid contact MEMS RF switch of claim 49, wherein said pattern of liquid contact regions comprises a patterned array of linearly converging lines.

51. The self-healing liquid contact MEMS RF switch of claim 49, wherein said pattern of liquid contact regions comprises a spiraled pattern of liquid contact regions.

52. The self-healing liquid contact MEMS RF switch of claim 44, further comprising one or more wetable traces interconnecting said first and second plurality of liquid contact regions.

53. The self-healing liquid contact MEMS RF switch of claim 52, wherein said one or more wetable traces are tapered.

54. The self-healing liquid contact MEMS RF switch of claim 44, further comprising an upper and lower actuating electrode each including one or more metal layers coupled to a base layer.

55. The self-healing liquid contact MEMS RF switch of claim 54, further comprising a pattern of getter dots disposed on at least one of said first and second actuating electrodes.

56. The self-healing liquid contact MEMS RF switch of claim 54, further comprising a number of spacer elements disposed on at least one of said first and second actuating electrodes.

57. The self-healing liquid contact MEMS RF switch of claim 54, wherein at least one of said upper and lower actuating electrodes includes a custom sloped surface.

58. The self-healing liquid contact MEMS RF switch of claim 57, wherein said custom sloped surface includes an S-shaped sloped surface.

59. The self-healing liquid contact MEMS RF switch of claim 57, wherein said custom sloped surface is recessed with the upper and/or lower actuating electrodes at a depth of about 4 to 8 microns.

60. The self-healing liquid contact MEMS RF switch of claim 44, further including a hermetically sealed enclosure containing argon gas.

61. The self-healing liquid contact MEMS RF switch of claim 44, further comprising heating means for heating said upper and lower diaphragms.

62. The self-healing liquid contact MEMS RF switch of claim 61, wherein said heating means includes one or more heater elements arranged about the upper and/or lower diaphragms.

63. The self-healing liquid contact MEMS RF switch of claim 44, wherein each of said upper and lower diaphragms includes a leading surface and a trailing surface.

64. The self-healing liquid contact MEMS RF switch of claim 63, wherein said leading surface includes a non-wetable layer of tungsten.

65. A self-healing liquid contact MEMS RF switch, comprising:

a hermetically sealed enclosure containing argon gas;

an upper diaphragm disposed within the enclosure and including a first plurality of liquid contact regions;

a lower diaphragm disposed within the enclosure and including a second plurality of liquid contact regions spaced apart from said first plurality of liquid contact regions; and

a liquid metal disposed within the space between the upper and lower actuating surfaces, said liquid metal being configured to wet with said first and second plurality of liquid contact regions to electrically actuate the switch.

66. A method of forming a self-healing liquid contact switch, comprising the steps of:

providing a lower substrate;

providing a custom slope etch within the surface of the substrate;

providing one or more layers above the surface of the substrate to create an upper and lower actuating surface each having a number of liquid contact regions thereon;

depositing an encapsulated droplet of liquid metal onto one or more of said liquid contact surfaces;

hermetically sealing the substrate with a transparent upper substrate; and

ablating the encapsulated droplet to release the liquid metal onto the liquid contact regions of said lower actuating surface.

67. The method of claim 66, wherein said step of forming a custom slope etch within the lower substrate surface includes the step of forming an S-shaped contour within the lower substrate surface.

68. The method of claim 66, wherein said ablating step is accomplished by laser ablating the encapsulated droplet.

69. The method of claim 66, wherein said ablating step is accomplished by heating the encapsulated droplet with one or more heater elements.